Art. IV.—*Notes on Some Recent Marine Deposits in the Neighbourhood of Williamstown.*

By F. E. GRANT and E. O. THIELE.

[Read 12th June, 1902.]

On the northern shores of Port Phillip, immediately to the west of Williamstown, there is a considerable series of beds of recent age, lying principally in depressions in the basalt, which is the prevailing rock of the district, but which, as a reference to the Geological Quarter-Sheet shows, extends in places for more than a mile inland.

The best section at present exposed for the examination of these beds occurs at a point on the now disused Railway to Altona Bay, about 200 yards west of the Kororoit Creek, about $2\frac{1}{2}$ miles from North Williamstown Railway Station, and about a quarter of a mile from the sea—lying immediately at the back of the Williamstown Racecourse. This particular spot has been referred to by Messrs. Hall and Pritchard[1] as a Post Tertiary marine deposit considerably above sea level. At this point the beds appear to be about 8 feet thick, and do not lie in a hollow in the basalt, but form part of a small rise through which a cutting about 5 feet high has been made for the purposes of the railway. At the north-east end of the cutting the rock is entirely basalt, the surface of which is seen to slope seawards, passing at first under a thin layer of shells and travertine and then disappearing altogether beneath the shell beds, which show for the entire depth of the cutting at its south-western end. These beds consist very largely of shells, interstratified with a a little fine white sand, and are regularly bedded. By careful collection over 80 species of Molluscs, also Echinoids, Polyzoa, Corals, etc., can be readily obtained from the face of the cutting, but we have so far been unable to find any which cannot be

[1] Proc. Roy. Soc. Vic., vol. ix. n. s., art. xiv.

referred to as living species, nearly all of which can be found living in the waters of the bay, although several of the forms are not now common on the neighbouring coast (*e.g.* Murex umbilicatus, Solen vaginoides, etc.). The beds are also traversed in places by seams of hard travertine in which almost all trace of the shells, from which they have been derived, has disappeared. This formation is no doubt due to the action of meteoric waters.

The very large number of shells present, and their perfect state of preservation, point to the beds not being of the nature of drifted sands or dunes. Even the most fragile of the Gasteropods such as Haminea brevis, Eunaticina umbilicata, Amphibola fragilis, Diala monile, Turbonilla mariae, and Turbonilla spina are rarely found in a broken state, while a large percentage of the Lamellibranchs are found as double valves, and appear to be *in situ*, showing no signs of being much weathered or of having travelled very far. Other similar beds along the coast present the same features in this respect, and to the west of the mouth of the Werribee, shell beds more extensive than those at Altona occur. They are there intersected by numerous sewerage channels, and consequently exhibit many fine sections, but we have not had an opportunity of investigating them throughly. The regular bedding of the shells, in every case, is worthy of notice—those of an estuarine type, such as Ophicardelus, Amphibola, etc., being frequently found in layers by themselves, interstratified with others of a more purely marine type—apparently pointing to alterations from time to time in the conditions under which the deposits were laid down. All the beds show a slight dip following the contour of the hill which they form. On sinking through the beds on the floor of the deepest part of the cutting to a distance of about 3 feet, a decomposed wackenitic clay was met with, which gave place to the ordinary basalt of the district at a greater depth.

The top of the beds was ascertained to be $7\frac{1}{2}$ feet above ordinary high water, and as the perfect condition of the shells renders it improbable that they are wind blown, further evidence would appear to be here present of at least 10 feet rise in the level of the land bordering this part of the bay during recent geological time.

In conclusion, we have to thank Messrs. A. Brown. and H. Summers, for taking the height of the beds above sea level.

The following is a list of the mollusca found in the deposit :—

Lamellibranchiata.

Barnea australasiae, Gray
Mactrella ovalina, Lamarck
„ cretacea, Angas
Anapella cuneata, Lamarck
Mesodesyma elongata, Deshayes
Soletellina livida, Lamarck
Tellina deltoidalis, Lamarck
„ decussata, Lamarck
Chione strigosa, Lamarck
„ aphrodina, Lamarck
„ striatissima, Sowerby
„ laevigata, Sowerby
Tapes fabagella, Deshayes
Venerupis crenata, Lamarck
Cardium tenuicostatum, Lamarck
Chamostrea albida, Lamarck
Loripes icterica, Reeve
Arca trapezina, Lamarck
„ fasciata, Reeve
Mytilus latus, Lamarck
Modiola nebulosa.
Pteria papilionacea, Lamarck
Diplodonta globularis, Lamarck
Solen vaginoides, Lamarck
Saxicava arctica, Linnaeus

Gastropoda.

Murex umbilicatus, T. Woods
„ triformis, Reeve
Lotorium verrucosum, Reeve
Fasciolaria coronata, Lamarck
Trophon paivae, Crosse
„ petterdi, Crosse
Cominella lineolata, Lamarck
„ costata, Quoy and Gaimard
Nassa fasciata, Lamarck

Nassa pauperata, Lamarck
„ labecula, A. Adams
„ rufocincta, A. Adams
Turricula scalariformis, T. Woods
Columbella lincolnensis, Reeve
Mangilia anomala, Angas
„ alucinans, Sowerby
Clathurella tincta, Reeve
Conus anemone, Lamarck
Natica plumbea, Lamarck
„ didyma, Chemnitz
„ conica, Lamarck
Eunaticina umbilicata, Quoy and Gaimard
Turbonilla spina, Crosse and Fischer
„ mariae, T. Woods
Obeliscus tasmanicus, T. Woods
Cerithium monachus, Crosse and Fischer
Bittium granarium, Kiener
„ cerithium, Quoy and Gaimard
„ lawleyanum, Crosse
„ minimum, T. Woods
Potamides australis, Quoy and Gaimard
Triforis angasi, Crosse and Fischer
Diala monile, A. Adams
„ lauta, A. Adams
„ pagodula, A. Adams
Risella melanostoma, Gmelin
Pseudoliotia micans, Adams
Phasianella australis, Gmelin
Astralium aureum, Jonas
Clanculus plebeius, Philippi
„ dunkeri, Koch
„ aloysii, T. Woods
Austrocochlea constricta, Lamarck
Diloma odontis, Wood
Phasianotrochus irisodontes, Quoy and Gaimard
Gibbula tiberiana, Crosse
Bulla australis, Gray
Cylichna arachis, Quoy

Haminea brevis, Quoy and Gaimard
Tornatina fusiformis, Adams
Siphonaria diemenensis, Quoy and Gaimard
Hipponyx australis, Lamarck
Calyptraea calyptraeformis, Lamarck
Haliotis naevosa, Martyn
Assiminea granum.
Amphibola fragilis, Lamarck
,, quoyana, Potiez
Ophicardelus australis, Quoy and Gaimard
Truncatella scalariana, Cox